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Nomenclature — Formal reports, proposals, and opinion

Abstract — Formal proposals to conserve or protect fungal names as well as proposals to amend the International Code of Nomenclature of immediate interest to mycologists are now published concurrently in Mycotaxon and Taxon. Conservation proposals include Prop. 1918 (to conserve the name *Dermatocarpon bucekii* against *Placidium steineri*), Prop. 1919 (to conserve the name *Lactarius* with a conserved type), Prop. 1926 (to conserve the name *Cladia* against *Heterodea,* and Prop.1927 (to conserve the name *Agaricus rachodes* with that spelling). Props. 117–119 to amend the Code ask for pre-publication deposit of nomenclatural information in a recognized repository for valid publication of fungal names.

1. Proposals to conserve or reject fungal names *

Proposal 1918:
To conserve the name *Dermatocarpon bucekii* (*Placopyrenium bucekii*) against *Placidium steineri* (lichenized *Ascomycota, Verrucariaceae*)**

Ayhan Şenkardeşler

Ayhan.Senkardesler@ege.edu.tr
Department of Biology, Faculty of Science, Ege University, Bornova, 35100 Izmir, Turkey

(1918) ***Dermatocarpon bucekii*** Nadv. & Servít 1936, Beih. Bot. Centralbl. 55B: 267, **nom. cons. prop.** Lectypus (vide Gueidan & al. 2009, Taxon 58: 196): Bulgarien, Rhodope, Karlik Batak, 1800 m, *J. Bucek* (M).

(=) ***Placidium steineri*** Wetts. 1889, Sitzungsberg. Kaiserl. Akad. Wiss., Math.-Naturwiss. Cl., Abt. 1. 98: 362. **nom. rej. prop.** Holotypus: Pisidien bei Sagalassus, 1885, *A. Heider* (WU)

Placidium steineri is a forgotten name that applies to a species of the genus *Placopyrenium* Breuss under current generic concepts because of its characters such as subsquamulose thallus, immersed perithecia lacking an involucrellum, and colourless, simple ascospores. This species was described from Antalya

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(turkey) in Wettstein's (l.c.: 348–398) publication, in which a little known list of lichens determined by J. Steiner was published in the second section entitled "Lichenes." The authorship of *P. steineri* has been variously attributed to both Wettstein and J. Steiner. Zahlbruckner (Cat. Lich. Univ. 1:236. 1921), for example, attributed the name to "Wettst. apud Stnr.". Wettstein (l.c.) noted that "Herr Prof. Steiner had die Art als neu erkannt und bescrhieben, jedoch nicht bennant; ich benne die Art hiermit ihm zu Ehren [Prof. Steiner has recognized and described the species as new; however he has not named it; I name the species herewith to honour him]". Therefore, as Wettstein was not only the author of the publication but also provided the name, albeit with Steiner providing the description, the authorship is simply *P. steineri* Wettst., accord to Art. 46 of the ICBN (McNeill & al. in Regnum Veg. 146, 2006).

Placidium steineri was collected from the ancient Greco-Roman town Sagalassus by Adolf Heider. This information is based on the citation in the protologue (Wettstein, l.c.: 362) as "Auf moosigem Boden bei Sagalassus [On mossy soil in Sagalassus]" as well as on the label of the capsule. This locality is situated inside the modern borders of the Antalya province. All collected materials during this expedition of Heider (including fungi, lichens, bryophytes, etc.) are deposited only in the University of Vienna Herbarium (WU) as stated in the original publication (Wettstein, l.c.: 349): "Die der vorliegenden Bearbeitung zu Grunde ligenden Pflanzen befinden sich in Herbare des botanischen Museums der k.k. Universität Wien [The plants upon which the present study is based are deposited in the Herbarium of the Botanical Museum of the K.K. University of Vienna]." Besides, the present author has checked for type materials of taxa described from Turkey and deposited in the Natural History Museum in Vienna (W) and WU after diligent searches in a period of five months (supported by TUBITAK and SYNTHESYS respectively) and only one specimen belonging to *P. steineri* has been seen. Therefore, this is considered here to be the holotype and this specimen was studied. The morphological view of the thallus and anatomical characters such as ascospore and pycnospore shape and size, as well as the thin pycnidia wall show that it is conspecific with *Placopyrenium bucekii* (Nádv. & Servít) Breuss in Stud. Geobot. 7 (Suppl.): 182. 1987, based on *Dermatocarpon bucekii* Nádv. & Servít (l.c.) published only in 1936, while *Placidium steineri* was published about four decades earlier, and thus has priority over the widely adopted name *Placopyrenium bucekii,* according to Art. 11.4 of the ICBN.

However, the name *Placidium steineri* never seems to have been accepted since its original publication, although Zahlbruckner (Cat. Lich. Univ. 1: 236. 1921) recombined it in *Dermatocarpon* Eschw. as *D. steineri* (Wettst.) Sahlbr. It has also not been included under any name in the regional checklist of the Mediterranean Turkey (John in Bocconea 6: 173–216. 1996), or in

local floristic lists for such provinces as Adana, Antalya, and Hatay (e.g., John & Nimis in Turkish J. Bot. 22: 257–267. 1998; Nimis & John in Cryptog. Bryol. Lichenol. 19: 35–58; Tufan & al. in Mycotaxon 94: 43–46. 2005, as supplement in http://www.mycotaxon.com/).

On the other hand, *Placopyrenium bucekii* is an uncontested species name in current use, known from the Balkan Peninsula, the Mediterranean Region, SE Asia and Ukraine, and it is included in current floras, e.g., Nimis & Poelt (in Stud. Geobot. 7: 1–269. 1987); and in modern checklists, e.g., Galun & Mukhtar (in Bocconea 6: 149–171. 1996), Hafellner & Kashta (in Herzogia 16: 135–142. 2003), John (in Bocconea 6: 173–216. 1996), Khodosovtsev (in Ukrainian J. Bot. 62: 111–114. 2005), Llimona & Hladun (in Bocconea 14: 1–581. 2001), Prieto & al. (in Bol. Soc. Argent. Bot. 43: 205–210. 2008), and in numerous regional floras.

As the name *Placopyrenium bucekii* is well established in numerous floras all over the distribution range of the species, the strict application of the ICBN would undoubtedly be undesirable. However, accepting this proposal to conserve it against *Placidium steineri* would allow *Placopyrenium bucekii* to be retained.

Proposal 1919:
To conserve *Lactarius* nom. cons. (*Basidiomycota*) with a conserved type**

Bart Buyck [1*], Valérie Hofstetter [2], Annemieke Verbeken [3] & Ruben Walleyn †

**buyck@mnhn.fr*

[1] *Muséum National d'Histoire Naturelle, Dépt. Systématique et evolution USM602, 75005 Paris, France*

[2] *Station de recherché Agroscope Changins-Wädenswil, Dépt. Protection des plantes Mycologie, 1260 Nyon 1, Switzerland*

[3] *Department of Biology, Ghet University K.L. Ledeganckstraat 35, 9000 Gent, Belgium*

[4] *Research Institute for Nature and Forest Gaverstraat 4, 9500 Geraardsbergen, Belgium*

(1919) ***Lactarius*** Pers., Tent. Disp. Meth. Fung.: 63. 14 Oct—31 Dec 1797 ('*Lactaria*'), **nom. et orth. cons.** Typus: *L. torminosus* (Schaeff. : Fr.) Pers. (*Agaricus torminosus* Schaeff.), **typ. cons. prop.**

The genus *Lactarius* (Pers. (1797, l.c.), as currently circumscribed, is a large mushroom genus with more than 400 currently accepted species (Verbeken 2001, in Micol. Veget. Medit. 16: 71–88), known in English as milk caps. Until recently, *Lactifluus* (Pers.) Roussel (1806), *Galorrheus* (Fr.: Fr.) Fr. (1825), *Lactariella* Schröter (1889), *Lactariopsis* Henn. (1901), *Gloeocybe* Earle (1909), and *Pleurogala* Redhead & Norvell (1993) were widely accepted as synonyms (Redeuilh & al. 2001, Mycotaxon 77: 127–143). A significant portion of the known species is included in the modern monographs of Hesler & Smith (1979, N. Amer. Sp. *Lactarius*), Heilmann-Clausen & al. (1998: *Lactarius,* Fungi Northern Eur.), Basso (1999: *Lactarius,* Fungi Europaei 7), and Verbeken (2008—in prep.: *Lactarius,* Fungus Fl. Trop. Africa 2). Comprehensive taxonomic contributions are also available for Central and South America (1979: Pegler & Fiard, Kew Bull. 33: 601–628; Singer & al. 1983, Nova Hedwigia Beih. 77: 1–352), South East Asia (Le & al. 2007, Fung. Diversity 24: 173–224, 27:61–94; Verbeken & Horak 1999 & 2000, Austral. Syst. Bot. 12: 767–779 & 13: 649–707; Verbeken & al. 2001, Sydowia 53: 261–289), Japan (Nagasawa 1998, Rep. Tottori Mycol. Inst. 36: 36–71) and New Zealand (McNabb 1971, New Zealand J. Bot. 9: 46–66). Many species are conspicuous and rather easily recognizable in the field and, therefore, included in hundreds of popular field guides in Europe, North America, and Asia (e.g., Phillips 1981,

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Mushrooms Great Britain Europe; Phillips 1991, Mushrooms N. Amer.; Imazeki & al. 1988, Fungi Japan) and various local journals. Several sections of the genus include well-known edible fungi that are regularly consumed in many parts of the world (Boa 2004, Wild Edible Fung.). In the Northern Hemisphere, this concerns especially *Lactarius deliciosus* (L. : Fr.) Gray and closely related species of *Lactarius* sect. *Deliciosus* (Fr. : Fr.) Redeuilh & al., with ongoing research focusing on large-scale production of the edible fruit bodies using artificial mycorrhization of seedlings (e.g., Parladé & al. 2003, Mycorrhiza 14: 171–175). Mushrooms of the genus *Lactarius* have also been shown to be a good source of bioactive secondary metabolites, especially sesquiterpenes (e.g., Daniewski & al. 1995, Phytochemistry 38: 1162–1168).

A recently published molecular phylogeny of the *Russulaceae* Lotsy (Buyck & al. 2008, Fungal Diversity 28: 15–40) demonstrated the existence of four major, phylogenetically distinct clades for the species currently accepted in the genera *Lactarius* and *Russula* Pers. In the same paper, the authors concluded that the most practical solution was to interpret these clades as four distinct genera instead of lumping them in one extremely large genus. Consequently, the few *Russula* species previously assigned to *Russula* sect. *Compactae* subsect. *Ochricompactae* Bills & O.K. Miller, as well as the rare American *Lactarius furcatus* Coker, now constitute the newly described genus *Multifurca* Buyck & Hofstetter (Buyck & al. 2008 l.c.). However, whereas all other *Russula* species remained firmly within a monophyletic '*Russula*' clade, the genus *Lactarius* appears to be paraphyletic, falling into two distinct clades, representing to us two different genera in the *Russulaceae*.

The first genus of milk caps would include the species hitherto classified in *Lactarius* subg. *Piperites* (Fr. ex J. Kickx f.) Kauffman (including *L. torminosus* (Schaeff.: Fr.) Pers. 1797 l.c.: 64, the type of this subgeneric name, as well as *L. deliciosus* [molecularly supported by Eberhardt & Verbeken 2004, Mycol. Res. 108: 1042–1052; Nuytinck & al. 2003, Belg. J. Bot. 136: 145–153]), *L.* subg. *Russularia* (Fr. ex Burl.) Kauffman, and *L. subg. Plinthogali* (Burl.) Hesler & A.H. Sm. (including *L. lignyotus* Fr., lectotype of *Lactariella*). The currently little used subgenera *Lactarius* subg. *Colorati* (Bataille) Bon, *Tristes* Hesler & A.H. Sm., and *Rhysocybella* Bon, as well as all sequestrate forms that hitherto most often were classified in the genera *Arcangeliella* Cavara (1900), *Zelleromyces* Singer & A.H. Sm. (1960), and *Gastrolactarius* J.M. Vidal (2005) also correspond to this clade (Nuytinck & al. l.c.; Eberhardt & Verbeken l.c.; Lebel & Tonkin 2007, Austral. Syst. Bot. 20: 355–381; Nuytinck & al. 2007, Mycologia 99: 820–832). Other previously recognized sequestrate genera in *Russulaceae* (*Cystangium* Singer & A.H. Sm., *Elasmomyces* Cavara, *Gymnomyces* Massee & Rodway, *Macowanites* Kalchbr., *Martellia* Mattir.) are synonyms of

Russula (Martín & Calonge 2000, Mycotaxon 76: 9–15; Miller & al. 2002, Mycologia 93: 344–354; Lebel & Tonkin l.c.).

The second genus of milk caps would then include the remainder of the old genus *Lactarius,* i.e., the species currently classified in *Lactarius* subg. *Lactarius,* subg. *Lactifluus* (Pers.) Hesler & A.H. Sm. (often with authorship incorrectly written "(Burl.) Hesler & A.H. Sm." [Art. 33.3]) and subg. *Lactariopsis* (Henn.) R. Heim, and a group not assigned to any subgenus, *L.* sect. *Edules* Verbeken (all molecularly supported by Buyck & al. l.c.), as well as the species of *Lactarius* subg. *Russulopsis* Verbeken, *L.* sect. *Panuoidei* Singer, and *L.* ser. *Gerardii* A.H. Sm. & Hesler (unpub. molecular data).

The currently listed lectotype of *Lactarius, L. piperatus,* sits in this latter generic clade. It was first designated type by Earle (1909, Bull. New York Bot. Gard. 5: 373–451) as pointed out by Donk (1949, Bull. Bot. Gard. Buitenzorg, sér III, 18: 271–402) and is currently accepted by most modern authors (e.g., Basso l.c.; Heilmann-Clausen & al. l.c.; Redeuilh & al. l.c.) as well as by the ICBN (appendix IIIB) when the orthography of the genus was conserved (Taxon 37: 457. 1988.) and hence cannot be changed without acceptance of a conservation proposal (Art. 14.8). The total number of described species belonging to this second *Lactarius* clade is much lower than the number of species described in the above-mentioned clade: on a worldwide scale, this second *Lactarius* clade (the one comprising the type, *Lactarius piperatus*) accounts only for about 20% to 25% of the currently described species. This percentage drops to 10% when considering only the better-known subtropical and more temperate zones of Europe, North America, and Asia. In tropical areas, especially tropical Africa, this second clade is much better represented, but most species are recently described and usage of their names in mostly confined to specialist taxonomic literature.

In the literature, we can find two other species names that have been cited as lectotype of *Lactarius: L. torminosus* and *L. deliciosus. Lactarius torminosus* was cited as type by Singer (1936, Ann. Mycol. 34: 286–378; 1972, Agaric. Mod. Tax. 2; 1975, Agaric. Mod. Tax. 3; 1986, Agaric. Mod. Tax. 4), Imai (1938, J. Fac. Agric. Hokkaido Imp. Univ. 43: 179–378), and recently also by Rayner (2005, Brit. Fung. Flora 8). *Lactarius delicious* was used as type by Singer & Smith (1946, Mycologia 38: 240–299), Singer (1951 ("1949") Agaric. Mod. Tax.) and Hesler & Smith (1979 l.c.). Both species to which these names apply are common and well known taxa that belong to the generic clade that does not include *L. piperatus* but, on the other hand, comprises most of the well-known northern hemisphere taxa that are part of the various revisions and monographs of the genus.

Lactarius piperatus is not only the current lectotype of *Lactarius,* it was once considered to be the lectotype for the generic names *Lactifluus* (Pers.) Roussel

(l.c.) and *Galorrheus* (Fr. : Fr.) Fr. In recent literature, both these genus names have exclusively been accepted as historical alternative names for *Lactarius* and as typified by Donk (1962, Beih. Nova Hedwigia 5: 107–109, 155–156) were treated as nomenclatural synonyms of *Lactarius* (Earle l.c.; Donk 1962 l.c.; Redeuilh & al. l.c.). *Lactifluus* was only used at the generic level by Roussel (l.c.) and Kuntze (1891, Revis. Gen. Pl. 2: 856). Persoon (1800, Comment. Schaeff.: x) introduced "*Lactifluus*" (nom. invalid., Art. 33.9) as a 'familia' and subsequently validly published *Agaricus* sect. *Lactifluus* in 1801 (l.c.). Although Donk (1962 l.c.: 155–156) argued that the infrageneric "*Lactifluus*" was a substitute for *Lactarius* [as *Lactaria*] Pers. (1797 l.c.), because Persoon did not designate a type, *Agaricus* sect. *Lactifluus* is automatically typified by *Agaricus Lactifluus* L. (Art. 22.6), which applies to a species nowadays generally recognized under the sanctioned name, *Lactarius volemus* (Fr. : Fr.) Fr. Typification of the other possible generic name, *Galorrheus,* is controversial, but that generic name is unavailable because it is considered to be an illegitimate later homonym of *Galarhoeus* Haw., *Euphorbiaceae* (1812, Syn. Pl. Succ.: 143).

In order to promote nomenclatural stability in the *Russulaceae* by limiting the number of name changes that could result from the phylogeny recovered by Buyck & al. (l.c.), we now propose to select *Lactarius torminosus* as a conserved type for *Lactarius* as (1) only this species is clearly part of the protologue of the genus (Persoon l.c.; (2) as it is the type of one of the main and most diverse subgenera *Piperites*) of the genus; (3) as it is also the most 'typical' *Lactarius* of the two names that have been mentioned as a lectotype of *Lactarius* in the sense that its whitish milk is the most common latex colour in the genus (as opposed to the orange to red latex of *L. deliciosus* which is almost confined to a few species of *L.* sect. *Deliciosi*); and (4) original material (Schaeffer 1762, Fung. Bavar. 1: pl. 12) also cited in the sanctioning work (Fries 1821, Syst. Mycol. 1: 63) is available and is here designated as lectotype for *Agaricus torminosus* Schaeffer.

The clear advantages of this generitype change are several:

(1) Most of the species that have been described in the genus would remain in *Lactarius,* avoiding hundreds of combinations with *Lactariella* Schröter, which would become the oldest available generic name for this clade. *Lactariella* is a long forgotten generic name that is combined with only two species epithets for taxa currently classified in *L.* subg. *Plinthogali.*

(2) Most of the *Lactarius* names used in the less specialized taxonomic literature will not be affected by the new phylogeny. The species of the generic clade that includes *L. piperatus* should then be transferred to *Lactifluus,* as this becomes the oldest unambiguous

generic name available for this clade. A number of required, significant combinations for taxa in the clade already exist with this generic name, namely: *Lactifluus piperatus* (L.) Kuntze, *L. vellereus* (Fr.) Kuntze, *L. deceptivus* (Peck) Kuntze. *L. volemus* (Fr.), *L. hygrophoroides* (Berk. & M.A. Curt.) Kuntze, *L. corrugis* (Peck) Kuntze, *L. gerardii* (Peck) Kuntze, and *L. princeps* (Berk.) Kuntze.

(3) The polyphyletic sequestrate genera and other species with slightly different morphologies that are now widely considered as synonyms for *Lactarius* and now being gradually abandoned would also remain unaffected.

The only disadvantage of this proposal—as with any genus transfer—is that it is unavoidable to affect at least a few widely used names. However, in our proposal the transfer to a different genus (*Lactifluus*) will be limited to about 90 species, which is considerably less than the several hundred combinations required if the type were no conserved as proposed.

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Proposal 1926:
To conserve *Cladia* against *Heterodea* (*Ascomycota*)**

H. Thorsten Lumbsch [1], Teuvo Ahti [2] & Sittiporn Parnmen [3,4]

tlumbsch@fieldmuseum.org
[1] Department of Botany, The Field Museum, 1400 S. Lake Shore Drive, Chicago, Illinois 60605, U.S.A.
[2] Botanical Garden and Museum, Finnish Museum of Natural History, P.O. Box 7, 00014 Helsinki University, Finland
[3] Department of Biology, Faculty of Science Srinakharinwirot University, Bangkok 10110, Thailand
[4] RAMK Herbarium, Department of Biology, Faculty of Science Ramkhamhaeng University, Bangkok 10140, Thailand

(1926) ***Cladia*** Nyl. in Bull. Soc. Linn. Normandie, sér. 2, 4: 167. 1870, **nom. cons. prop.** Typus: *C. aggregata* (Sw.) Nyl. (*Lichen aggregatus* Sw.).

(=) *Heterodea* Nyl. in Bull. Soc. Linn. Normandie, sér. 2, 2: 47. 1868, **nom. rej. prop.** Typus: *H. muelleri* (Hampe) Nyl. (*Sticta muelleri* Hampe).

Heterodea was introduced by Nylander (9 Jan–Feb 1868, Syn. Lich. Nov. Caled. re- or pre-printed from Bull. Soc. Linn. Normandie, as cited above) for one species, *H. muelleri* from New Caledonia. A second species, *H. madagascarea* Nyl., was described from Madagascar (Nylander 1888, Lich. Nov. Zel.: 21). The latter species has subsequently been shown to be unrelated and reduced to synonymy with *Gymnoderma coccocarpum* Nyl. (Jahns & van der Knapp 1973, Herzogia 2: 437–451). Subsequently, a further species of *Heterodea* has been described from Australia, bringing the number of accepted species in the genus back to two (Filson 1978, J. Hattori Bot. Lab. 10: 13–25). The family position of *Heterodea* has remained uncertain. While some authors assumed a relationship with *Parmeliaceae* Zenker based on the foliose growth form (Blackman & al. 1973, Bryologist 76: 410–413), others placed it in *Cladoniaceae* Zenker (Jahns & van der Knapp 1973, Herzogia 2: 437–451; Poelt in Ahmadjian & Hale 1974, The Lichens: 599–632). Subsequently, Filson (1978 l.c.: 15) described a monogeneric family to accommodate this genus. However, molecular data showed that the genus is nested within *Cladoniaceae* (Wedin & al. 2000, Lichenologist 32: 171–187).

The generic name *Cladia* was introduced in a discussion under *Ramalina pumila* subsp. *javanica* Nyl. on p. 69 of a *Ramalina* monograph (Recognitio Monographica Ramalinarum, reprinted with separate pagination from Bull. Soc. Linn. Normandie, sér. 2, 4: 101–180. 1870) to accommodate three

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species: *Cladia aggregata* and two others referred to only as epithets in the accusative, "*retiporam*" and "*schizoporam*". No direct references to the basionyms or their authors of the included species were given. However, "*retipora*" and "*schizopora*" were unique published fungal epithets that were applied to lichens before 1870 and therefore there is distinct indirect evidence that their basionyms are *Baeomyces retiporus* Labill. 1806 and *Cladonia schizopora* Nyl. 1860. The existence of several earlier epithets "*aggregata*" (*-us*, *-um*) applicable to fungi precludes the same unequivocal recognition of the basionym of *Cladia aggregata*, but since Nylander gave a description both of it ("in *Cladia aggregata* stratum corticale totum ex elementis filamentosis longitudinalibus dense conglutinatum") and of *Cladia* ("thallo terebrato analogas"), the name is validly published in any case and under Art. 33.3, it can be recognised as based on *Lichen aggregatus* Sw., applicable to the same species (and also the only earlier use of the epithet in what is now recognised as the family *Cladoniaceae*).

Because three validly published species names were referred to indirectly (Art. 10.3) in the protologue, a lectotypification for *Cladia* was required, and Filson (1981, J. Hattori Bot. Lab. 49: 1–75) was apparently the first to lectotypify *Cladia* with *C. aggregata*. However, as Nylander did not definitely associate their epithets with the generic name *Cladia* (Art. 33.1) the combinations *Cladia retipora* (Labill.) Nyl. and *C. schizopora* (Nyl.) Nyl. were not technically validly published with the protologue of *Cladia* but were validated later.

Subsequently, a number of additional species were described and currently 14 species are accepted (Ahti 2000, Fl. Neotrop. Monogr. 78: 1–362; Filson 1981 l.c., 1984, Lichenologist 16: 94–96, and 1992, Fl. Austral. 54: 101–107; Kantvilas & Elix 1987, Mycotaxon 29: 199–205, and 1999, Muelleria 12: 135–162). The genus was classified in *Cladoniaceae* (Henssen & Jahns 1973 ['1974'], Lichenes: 311; Poelt, l.c.) or in a separate family *Cladiaceae* (Filson 1981, l.c.). Molecular data showed that the genus *Heterodea* is nested in *Cladoniaceae* (Wedin & al. l.c.), where it is currently placed (Lumbsch & Huhndorf 2007, Myconet 13: 1–58).

In a recent molecular study (Parnmen & al. 2010 in press, Taxon 59) we demonstrated that the genus is nested within *Cladia*. Consequently, the two genera cannot be kept separate and are best regarded as congeneric. The genera also share the same type of ascoma structures, vegetative anatomical structures, and secondary metabolites. The genus *Heterodea* includes only two currently accepted species that are restricted to Australasia, while *Cladia* includes 14 species with a wide distribution in the Southern Hemisphere and one pantropical species. Over the last decades, the generic name *Cladia* has been widely used in numerous standard floras, checklists, and other publications (Ahti l.c.; Filson 1992 l.c.; Galloway 2007, Fl. New Zealand Lichens, ed. 2; Harada & al. 2004, Lichenology 2: 47–165; Kurokawa & Kashiwadani 2006, Checkl. Jap.

Lichens: 157; Malcolm & Galloway 1997, New Zealand Lichens: Checkl., Key Glossary: 192; McCarthy 2003, Cat. Austral. Lichens: 237; Wolseley & al. 2002, Bull. Brit. Mus. (Nat. Hist.) Bot. 32: 13–59). No authors have ever included *Cladia* in *Heterodea*. In order to avoid numerous name changes in a well-established genus we propose *Cladia* for conservation against *Heterodea*.

Proposal 1927:
To conserve the name *Agaricus rachodes* (*Basidiomycota*) with that spelling**

Else C. Vellinga [1]* & Shaun R. Pennycook [2]

* *ecvellinga@comcast.net*
[1] *Department of Plant and Microbial Biology*
111 Koshland Hall, University of California at Berkeley, Berkeley CA 94720-3102, U.S.A.
[2] *Manaaki Whenua Landcare Research*
Private Bag 92 170, Auckland 1142, New Zealand

(1927) ***Agaricus rachodes*** Vittad., Descr. Fung. Mang.: 158. 1833 ('1835'), **orth. cons. prop.**

Chlorophyllum rachodes (Vittad.) Vellinga is a common, widespread and edible mushroom species, whose name has been challenged by the alternative spelling 'rhacodes'.

In a separate paper (Vellinga & Pennycook 2010 in press, Taxon 59) we outlined the history of the usage of the epithet '*rachodes*' and its challenger '*rhacodes*', and the range of potential etymologies, transliterations, and orthographies of these two epithets. Recapitulating briefly: Vittadini (1833, Descr. Fung. Mang.: 158) described *Agaricus rachodes*, without an etymology either explicit or implied, but using that spelling of the epithet consistently. The variant spelling, '*rhacodes*' was first introduced by Fries (1849, Summa Veg. Scand.: 273) who alternated between the two spellings during his lifetime. After Saccardo's (1887, Syll. Fung. 5: 29) listing of the spelling '*rhacodes*', this became the more commonly used spelling in Europe until the late 20th century, when it was reiterated that '*rachodes*' was the correct original spelling (Candusso & Lanzoni 1990, Lepiota. Fungi eur. 4: 536; De Kok & Vellinga 1998, Persoonia 17: 70). Outside Europe, '*rachodes*' remained the more commonly used spelling during the 20th and into the 21st centuries (e.g. Kauffman 1924, Pap. Mich. Acad. Sc. Arts Letters 4: 328; Imazeki & Hongo 1962, Colour. Ill. Fung. Japan: 48; May & Wood 1997, Fungi Australia 2A: 105; Pennycook 2004, Fungi New Zealand 1: 192).

As Vittadini did not publish an etymology we have to guess at the meaning this word had for him. Two possible roots for the epithet are the Greek words 'ρακος' (rag) and 'ραχος' (bush, quickset hedge); the derivations and transliterations of these can be spelled as '*racodes*', '*rhacodes*', '*rachodes*', and '*rhachodes*'.

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Article 60.1 of the ICBN (McNeill & al. 2006, Regnum Veg. 146) requires that "the original spelling of a name or epithet is to be retained", with the exception of typographical and orthographical corrections (plus a short list of typographical and grammatical standardisations, which does not include the transliteration of Greek words) and Art. 60 Ex. 1 exemplifies the fact that this does not permit the introduction of corrections based on "philologically preferable" forms. Article 60.3 discourages the introduction of corrections that change the first syllable of a name, another reason to retain the original spelling. Vittadini (1833, Descr. Fung. Mang.: 158-162) was consistent in his use of '*rachodes*' in the Latin text and '*racode*' in the Italian. Furthermore, the original spelling has remained in use throughout the time since the original description. It is true that currently the spelling '*rhacodes*' is used twice as often as '*rachodes*' (based on an internet based search engine; '*rhacodes*' hits include some plant and algal genera). However, the two most influential fungal websites, Index Fungorum and Mycobank, both adopt the alternative spelling '*rhacodes*', and we expect that the numbers would begin to change if those authoritative institutions were to reintroduce the original '*rachodes*', just as they did over a century earlier in Europe after Saccardo's Sylloge Fungorum listed '*rhacodes*'.

To end a longstanding nomenclatural dispute, we here formally propose to conserve the name *Agaricus rachodes* with the original spelling under ICBN Article 14.11—this epithet spelling has remained constantly in use throughout the name's 175 year history; a philological justification for the change to '*rhacodes*' cannot be sustained because of the unknown etymology; and ICBN Articles 60.1 and 60.3 clearly support the retention of the original spelling.

2. Proposals to amend the Code *

Proposals 117–119:
To make the pre-publication deposit of key nomenclatural information in a recognized repository a requirement for valid publication of organisms treated as fungi under the Code **

David L. Hawksworth [1*], Jerry A. Cooper [2], Pedro W. Crous [3], Kevin D. Hyde [4], Teresa Iturriaga [5], Paul M. Kirk [6], H. Thorsten Lumbsch [7], Tom W. May [8], David W. Minter [6], Jitendra K. Misra [9], Lorelei Norvell [10], Scott A. Redhead [11], Amy Y. Rossman [12], Keith A. Seifert [11], Joost A. Stalpers [3], John W. Taylor [13] & Michael J. Wingfield [14]

* *d.hawksworth@nhm.ac.uk*

[1] *Dpto. de Biología Vegetal II, Fac. de Farmacia, Universidad Complutense de Madrid Plaza Ramón y Cajal, Madrid 28040, Spain & Department of Botany, Natural History Museum, Cromwell Road, London SW7 5BD, U.K.*

[2] *Landcare Research, P.O. Box 40, Lincoln 7640, New Zealand*

[3] *CBS–KNAW Fungal Diversity Centre PO Box 85167, 3508 AD Utrecht, The Netherlands*

[4] *School of Science, Mae Fah Laung University, Chiang Rai 75100, Thailand*

[5] *Departamento Biología de Organismos, Universidad Simón Bolívar Apartado 89000 Sartenejas, Baruta, Edo. Miranda, Venezuela*

[6] *CABI–Europe, CAB International, Bakeham Lane, Egham, Surrey TW20 9TY, U.K.*

[7] *Department of Botany, The Field Museum of Natural History 1400 Lake Shore Drive, Chicago, IL 60605-2495, U.S.A.*

[8] *Royal Botanic Gardens Melbourne Private Bag 2000, South Yarra, Victoria 3141, Australia*

[9] *Department of Botany, Sri Jai Narain Postgraduate College, Lucknow 226001, India*

[10] *Pacific Northwest Mycology Service, 6720 NW Skyline Boulevard, Portland, OR 97229 U.S.A.*

[11] *Biodiversity (Mycology and Botany), Agriculture and Agri-Food Canada 960 Carling Avenue, Ottawa, Ontario K1A 0C6, Canada*

[12] *USDA-ARS Systematic Botany and Mycology Laboratory 10300 Baltimore Avenue, Beltsville, MD 20705, U.S.A.*

[13] *Department of Plant and Microbial Biology, University of California Berkeley, CA 94720-2465, U.S.A.*

[14] *Forestry & Agricultural Biotechnology Institute University of Pretoria, Pretoria, 0002 South Africa*

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Mycologists first proposed the introduction of some form of a mandatory indexing system for newly proposed fungal names in the 1950s (Ainsworth & Ciferri 1955, Taxon 4: 3-6). Following informal discussions amongst mycologists – particularly during the 7th International Mycological Congress in Oslo in 2002 – the CBS-Fungal Diversity Centre in Utrecht initiated MycoBank in 2004 (Crous & al. 2004, Mycol. Res. 108: 1236–1238; Crous & al. 2004, Stud. Mycol. 50: 19–20). This step was taken in order to test the willingness of mycologists to use a depository system where they could place information on new scientific names they were proposing. MycoBank is a fully online system whereby the proposers of new scientific names of organisms treated as fungi under the Code (i.e. including chytrids, oomycetes, and slime moulds; Pre-7 of the ICBN; McNeill & al. 2006, Regnum Veg. 146) can deposit key information that becomes public and freely available on the worldwide web only after effective publication of the work including those names. Each name is assigned a unique number from a range made available by Index Fungorum to MycoBank. (Index Fungorum is a partnership of CAB International, CBS-KNAW Fungal Diversity Centre, and Landcare Research that offers a freely available nomenclator of fungal names in all ranks online to the public. As of January 2010, the Index Fungorum database held information on 450,280 names; see http://www.indexfungorum.org/.)

MycoBank operates similarly to GenBank, which provides unique identifiers for molecular sequence data. MycoBank does not require any hard-copy material to be lodged at CBS or elsewhere, but serves to disseminate information on newly proposed taxa widely and rapidly at no cost to all users, whether they are depositors or interrogators. Since 2007, MycoBank has operated under the auspices of the International Mycological Association (IMA), which has assumed long-term responsibility for its operation. Like IAPT, IMA is a Scientific Member of the International Union of Biological Sciences (IUBS).

Scientific names in all ranks are covered in the existing MycoBank system. The basic information required for deposition of a newly described taxon is the name itself, the validating Latin (or for fossil fungi, English) description or diagnosis, details of the nomenclatural type, and (for species and infraspecific taxa) where the type is permanently preserved. New combinations and replacement names require only the full bibliographic reference to the basionym or replaced name, as already specified by Art. 33.4. MycoBank personnel check the uniqueness of the name, alert the depositor to any earlier homonym, and draw attention to orthographic errors (such as incorrect Latin terminations), but do not express any taxonomic opinions; i.e. there is no censorship. Index Fungorum, as the body issuing unique numbers for fungal names, automatically receives a copy of all nomenclatural information deposited in MycoBank.

Depositors are additionally encouraged – but not required – to provide available information (e.g. GenBank accession identifiers, where living cultures are deposited, detailed descriptions, illustrations, other comments, or a copy of in-press publications). After publication, the actual volume and page references can be inserted in the MycoBank database, and some publishers (e.g. Elsevier, Mycotaxon) have indicated that they have no objection to the full text of published articles being attached, for example as Portable Document Format files (PDFs).

MycoBank and Index Fungorum are now favourably and almost universally accepted by the mycological community (Stalpers & al. 2009, Bull. Zool. Nomencl. 66: 14–17). The proportion of newly proposed names deposited in MycoBank is increasing: in 2005, 353 of 1893 new fungal names introduced that year were deposited (i.e. 19 %); in 2006, 857 of 2339 (37 %); in 2007, 1392 of 2436 (57 %); in 2008, 1292 of 2342 (55 %); and in 2009, 1666 (the total for the year is not yet available from the Index of Fungi). Further, Taxon and the leading mycological journals that regularly publish new scientific names of fungi now require authors to deposit information in MycoBank and cite the MycoBank reference numbers as a condition of publication. These journals include: The Bryologist, Czech Mycology, Fungal Biology (formerly Mycological Research), Fungal Diversity, Graphis Scripta, The Lichenologist, Mycologia, Mycologica Balcanica, Mycology, Mycoscience, Mycosphere, Mycotaxon, Nova Hedwigia (lichen papers), Opuscula Philolichenum, Persoonia, Studies in Mycology, and Sydowia.

The attitudes of individual mycologists to the existing MycoBank system and other nomenclatural issues were explored by questionnaires distributed at three major mycological meetings in August-September 2007: nomenclatural sessions or symposia at the Mycological Society of America annual meeting (Baton Rouge, Louisiana), the XV Congress of European Mycologists (St Petersburg, Russia), and the XVI Simposio Botánica Criptogámica de España (Léon, Spain). A total of 95 ballots were completed from this geographically dispersed spectrum of mycologists. All did not vote on all issues, but of those voting, 85 % (73) were in favour of making deposit in MycoBank mandatory for the valid publication of new fungal taxa (Hawksworth 2007, Mycol. Res. 111: 1363-1364). Further, in July 2008 the International Association for Lichenology (IAL), meeting in Asilomar, California, passed a resolution endorsing the establishment of MycoBank under the auspices of the IMA, encouraging lichenologists to deposit information on newly recognized taxa in it, and urging editors who had not yet done so to make such deposits a condition of publication.

The proposals below aim to incorporate into the Code what has become the regular practice of most mycologists and of key mycological journals. If accepted, the proposals made here will benefit the entire mycological community, which then will be assured of immediate and complete access to the key nomenclatural information on new fungal names proposed after 1 January 2013.

This will be of enormous and immediate benefit to the discipline, because mycology now has an almost complete catalogue of fungal names in Index Fungorum (www.indexfungorum.org), and this new proposal will mean mycologists have access to a free, ongoing, and continuously updated repository for new fungal names. There is already a major lag in the time between publication of a name and appearance in the printed twice-yearly Index of Fungi; the latest issue (July 2009) comprises only names published in 2008 and before. As mycology no longer has any institution with the resources to search out all names from the literature, do-it-yourself repositories provide a relatively easy and effective mechanism to establish and maintain an accurate and up-to-date list of fungal names.

We wish to draw attention to two differences between the proposals made here and previous proposals on the "registration" of botanical names: (1) there is no requirement to submit printed matter (including protologues) to a registering office designated by the International Association for Plant Taxonomy (IAPT) as proscribed in the text incorporated into the Tokyo Code (Art. 32.2); and (2) the deposit of names is restricted to their author(s) and deposition by third parties of newly proposed names is not allowed after the requirement becomes mandatory, contrary to the proposals of Borgen & al. (Taxon 1998, 47: 899–904). Technological advances since 1996 have rendered the first requirement superfluous, and author-restricted deposition and activation clarifies author intent. However, the proposals do not preclude others depositing information on names proposed prior to 1 January 2013 after that date. The deposit of nomenclatural information in a recognized repository, as proposed below, does not obviate the need for author(s) to fulfil the current requirements of the Code in relation to effective publication (Art. 29.1), nor does it affect the date of effective publication (Art. 31.1).

We forward these proposals at this time so that they will be available for debate at the Nomenclature Session to be convened during the IX International Mycological Congress in Edinburgh in August 2010. We shall transmit the outcomes of that debate to the Nomenclature Section meetings at the International Botanical Congress in Melbourne in July 2011 for final decision.

We wish to emphasize that, while most of us making these proposals have, or have recently held, positions in international mycological organizations or committees, we make them here in our personal capacities in anticipation

of their consideration by mycologists as a whole at the forthcoming 9th International Mycological Congress.

(117) Add a new Article 37bis:

"*37bis.1*. For organisms treated as fungi under this Code (Pre.7), from 1 January 2013 the citation of an identifier issued by a recognized repository (Art. 37*bis*.3) in the protologue is an additional requirement for valid publication.

37bis.2. For an identifier to be issued by a recognized repository as required by Art. 37*bis*.1, the minimum elements of information that must be accessioned by author(s) of scientific names are those required for valid publication under Art. 32.1 (b-e).

Note 1. Issuance of an identifier by a recognized repository based upon the presumed future fulfilment of requirements under Art. 32.1 (b-e) does not in itself constitute or guarantee a valid publication of a proposed name; that can occur only on effective publication (Art. 29) if the requirements of Art. 32.1 (b-e) are simultaneously fulfilled in that publication.

37bis.3 The Committee for Fungi (Div. III.2 (4)) has the power to: (1) appoint one* or more localized or decentralized open and accessible electronic repositories to perform this function*; (2) remove such repositories at its discretion; and (3) set aside the requirement to deposit information on newly proposed scientific names for organisms treated as fungi under the Code in a recognized repository, should the repository mechanism, or essential parts thereof, cease to function. Decisions made by the Committee under these powers are subject to ratification at the subsequent International Mycological Congress.

* The only current operational repository appointed is MycoBank (www.mycobank.org).

The Editorial Committee may wish to consider combining the existing Arts 38 and 39, both of which deal with illustrations, to avoid changing the numbering of subsequent articles in the Code. In addition, the Committee is also requested to: (1) change "International Mycological Congress" to "International Botanical Congress" in the proposed Art. 37*bis*.3 should Props 016-020 (Hawksworth & al. 2009, Taxon 58: 658-659; Hawksworth & al. 2009, Mycotaxon 108: 1-4) not be accepted by the Nomenclature Section; and (2) revise the wording of the proposed footnote as necessary to take account of any decisions on repositories made by the Committee for Fungi prior to the publication of the Melbourne Code.

(118) Insert a new Recommendation 37bisA.1:

"*37bisA.1.* Authors of names of organisms treated as fungi under this Code are encouraged to: (a) deposit minimal elements of information in relation to the names in a recognized repository, and obtain accession identifiers, as soon as possible after their papers are accepted for publication; and (b) after the effective publication of the name, inform the recognized repository of the complete bibliographical details, including for example, the volume, part number, page number, date of publication, and (for books) the publisher and place of publication."

(119) Insert a new paragraph Art. 33.1bis:

"*33.1bis.* On or after 1 January 2013, in the case of organisms treated as fungi under this Code, the citation of a repository identifier (Art. 37*bis*.1) for the new combination or new name in the publication in which it is introduced is required for valid publication."

Acknowledgement

We are indebted to John McNeill (Edinburgh) for particularly constructive comments made during the preparation of this set of proposals.

Proposals 090–091:
To add two examples on the valid publication of the names of higher-level taxa.

Update—The proposals to add two examples on the valid publication of the names of higher level taxa (Redhead 2009: Mycotaxon 110: 503–504, 2010: Taxon 59: 308–309) were still not numbered when the 2009 October–December Mycotaxon was sent to press. At that time, we informed Mycotaxon readers that we would announce the official numbers in Mycotaxon 111. The above proposals to amend the Code are now formally referred to as Props. 090–091.

—Lorelei Norvell, Mycotaxon *Editor-in-Chief*